

What is claimed is:

1. A star network device fabricated as a central node on an integrated circuit for transmitting optical data to a plurality of optical transmission lines, wherein said optical data is transmitted to a plurality of secondary nodes, comprising:

5 a plurality of optical transmitting means and optical receiving means attached to said central node, wherein there is a dedicated optical transmission means and a plurality of dedicated optical receiving means on said central node for each of said secondary nodes;

10 a plurality of optical communications lines mating to said optical transmitting means and said optical receiving means; and

a means of processing said optical data using receiver reserved protocol.

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2. A star network device according to claim 1, wherein said optical communications lines mate individually with said optical transmitting means and said optical receiving means such that there is a one-to-one correspondence between said optical communications lines and said optical transmitting means and said optical receiving means.

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3. A star network device according to claim 1, wherein said optical transmission means is selected from the group consisting of Vertical channel surface emitting lasers (VCSELs), light emitting diodes (LEDs) and Resonant Cavity Light Emitting Diode (RCLED).

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4. A star network device according to claim 1, wherein said central node is subdivided into a plurality of central sub-nodes.

5. A star network device according to claim 1, wherein said processing means contains first-in-first-out (FIFO) buffer.

6. A star network device according to claim 1, wherein said secondary nodes are leaf nodes.

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7. A star network device according to claim 1, wherein said secondary nodes are additional central nodes.

5 8. A star network device according to claim 1, wherein said secondary nodes are a combination of additional central nodes and leaf nodes.

9. A star network device according to claim 1, wherein said array is bi-directional and sends and receives said optical data.

10 10. An optical data communications device according to claim 1, further comprising a means of routing data around a fault.

11. A reconfigurable optical data communications device fabricated as a central node on an integrated circuit, comprising:

15 an array having a plurality of optical transmitters and optical receivers arranged on said central node, wherein said optical transmitter and optical receivers are capable of transmitting and receiving optical data;

20 a fiber optic array with mating fiber optic cables, wherein said mating fiber optic cables establish a one-to-one connection to each said optical transmitter and each said optical receiver;

a means of separating said mating fiber optic cables to enable connection to other nodes; and

25 a processing means for controlling said optical data at said central node using a receiver reserved protocol.

12. A reconfigurable optical data communications device according to claim 11, wherein said mating fiber optic cables connect to a plurality of central sub-nodes.

30 13. A reconfigurable optical data communications device according to claim 11, wherein said mating fiber optic cables connect to a plurality of leaf nodes.

14. A reconfigurable optical data communications device according to claim 11, wherein said mating fiber optic cables are connected to form any of the topologies selected from the group consisting of linear, tree, switched fabric and ring.

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15. A reconfigurable optical data communications device according to claim 11, wherein said mating fiber optic cables connect to a processing unit off-chip.

- 10 16. A reconfigurable optical data communications device according to claim 11, wherein said mating fiber optic cables connect to optical transmitters and optical receivers on said integrated circuit, wherein said integrated circuit comprises a plurality of said central nodes and a plurality of said leaf nodes.

